

Appl. No.: 09/808,945
Amdt. Dated: October 22, 2003
Reply to Office Action of: 08/05/2003

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the application:

BB
1. (currently amended) A diffraction type lens, disposed in a luminous flux, having a wavelength selectivity;

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said lens being constituted by a substrate having one surface formed with a zone plate exhibiting a smaller converging action with respect to a wavelength λ_1 of light and a greater converging action with respect to a wavelength λ_2 of light, and the other surface formed with a zone plate exhibiting a smaller converging action with respect to said wavelength λ_2 of light and a greater converging action with respect to said wavelength λ_1 of light, said substrate being transparent to said wavelengths λ_1 and λ_2 of light, wherein each of said zone plates comprises concentric gratings each having a rectangular cross section.

2. (original) A diffraction type lens according to claim 1, wherein said diffraction type lens is shaped like a parallel plate.

3. (canceled)

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4. (original) A diffraction type lens according to claim 1, wherein said one surface formed with the zone plate has a height h_1 satisfying the following conditional expressions (1) and (2), and said the other surface formed with the zone plate has a height h_2 satisfying the following conditional expressions (3) and (4):

$$h_1 = L_1 \lambda_1 / (n_1 - 1) \quad (1)$$

$$h_1 = M_1 \lambda_2 / (n_2 - 1) + K_1 \lambda_2 / 2 (n_2 - 1) \quad (2)$$

$$h_2 = L_2 \lambda_2 / (n_2 - 1) \quad (3)$$

$$h_2 = M_2 \lambda_1 / (n_1 - 1) + K_2 \lambda_1 / 2 (n_1 - 1) \quad (4)$$

where

λ_1 and λ_2 are the respective wavelengths of two incident light beams;

n_1 is the refractive index of a grating portion with respect to the wavelength λ_1 of light;

n_2 is the refractive index of a grating portion with respect to the wavelength λ_2 of light;

L_1 and L_2 are positive integers;

M_1 is the maximum value among 0 and positive integers satisfying the conditional expression of $h_1 > M_1 \lambda_2 / (n_2 - 1)$;

M_2 is the maximum value among 0 and positive integers satisfying the conditional expression of $h_2 > M_2 \lambda_1 / (n_1 - 1)$; and

K_1 and K_2 are values of at least 0.65 but not exceeding 1.35.

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5. (currently amended) [An optical pickup apparatus comprising the diffraction type lens according to claim 1,] A diffraction type lens, disposed in a luminous flux, having a wavelength selectivity; said lens being constituted by a substrate having one surface formed with a zone plate exhibiting a smaller converging action with respect to a wavelength λ_1 of light and a greater converging action with respect to a wavelength λ_2 of light, and the other surface formed with a zone plate exhibiting a smaller converging action with respect to said wavelength λ_2 of light and a greater converging action with respect to said wavelength λ_1 of light, said substrate being transparent to said wavelengths λ_1 and λ_2 of light wherein each of said zone plates comprises concentric gratings each having a rectangular cross section, wherein said luminous flux incident on said diffraction type lens is substantially a parallel luminous flux.

6. (original) An optical pickup apparatus according to claim 5, wherein said luminous flux is converged at a position where two kinds of optical recording media having thickness values different from each other are disposed, said wavelength λ_1 of light being used for recording or reproducing one optical recording medium, said wavelength λ_2 of light being used for recording or reproducing the other optical recording medium.